MICRO CASE 88:

In early summer, **a previously healthy 42 yr-old** man was admitted to his local hospital with a 1-week history of **fever, muscle aches, and malaise**. For 2-days before the admission, he noted shortness of breath, and on the day of admission he felt extremely weak.

In the 3 weeks before becoming unwell, the patient had been stationed at a **rural campsite in New Mexico**. He had reported that in and around his tent, there had been many **deer mice**, although he had not been bitten.

* PHYSICAL EXAM: crackles on lung exam heard
* LAB FINDINGS: hypotension and lobar pneumonia
* DIFFERENTIAL:
  + Atypical bacterial pneumonia (e.g. Mycoplasma, Chlamydia, Q fever)
  + Dengue hemorrhagic shock syndrome
  + Meningococcemia (sepsis)
  + Plague
  + Respiratroy viral infections: adenovirus, influenza, SARS
  + Rickettsial infection
  + Sin Nombre virus
  + Tularemia
  + Typical bacterial pneumonia (e.g. Strep pneumonae)
  + Rationale:
    - Although the manifestation of severe pneumonia and hypotension is not common, it can be due to typical bacterial pneumonia. However, atypical pneumonia and other unusual zoonotic infections should also be considered. Meningococcemia may manifest with hypotension, but lobar pneumonia is uncommon. Mycoplasma, Chlamydia, and Q fever do not generally cause hypotension. Although adenovirus may vause severe pneumonia, other viruses, such as SARS, hantavirus, or dengue hemorrhagic shock syndrome would be more likely. These would be expected to be seen in certain geopgraphic areas or with specific exposure.
* DIAGNOSTIC WORK-UP
  + Rapid Ag test or direct immunofluorescence antibody staining of Nasopharyngeal (NP) swab
  + Gram and acid fast stain of respiratory secretions or lung biopsy
  + Sputum cultures for acid—fast bacilli, fungi, or bacteria
  + In failed tests, Serology (specific IgG) or PCR from target DNA from blood clots and lung biopsy specimens.
* Source = Sin Nombre virus
* MICROBIOLOGIC PROPERTIES
  + Bunyavirus
  + Replicate exclusively in host cell cytoplasm
  + Laboratory diagnosis includes: (1) detection of hantavirus-specific IgM (even in prodrome); or (2) rising titers of hantavirus-specific IgG or (3) detection of hantavirus-specific RNA by RT-PCR in clinical specimens (blood clots or lung biopsy specimens)
* MANNER OF EXPOSURE
  + Human infection is strongly associated with rodent urine or droppings in a tight environment (e.g. campsite)
  + Transmission occurs when dried materials contaminated by rodent excreta are disturbed and inhaled.
  + Not associated with person-to-person transmission in U.S. but has in other countries
  + Adult men are at higher risk for severe disease if they bear one particular B locus allele, B\*35.
  + **Aerosols of the virus could be a potential agent for weaponization (bioterrorism)**
* Route of infection, Tissues they reside in and transmission to others
  + *Incubation period = 1-5 weeks*
  + The **b3 integrins** are the cellular receptors for pathogenic hantaviruses.
  + TNF and IL-2 involved in pathogenesis. **Activated CD 8+ T cells produce holes in infected pneumocytes**. The nonspecific prodrome includes fever, chills, myalgia, headache, and GI upset. Prodrome followed by **bilateral interstitial pulmonary infiltrate**s and respiratory compromise (resembling Acute Respirator Distress Syndrome).
  + **Thrombocytopenia and left shift (>15% bands) are almost always evident\*\***
* TREATMENT
  + No specific antiviral treatment. **Ribavirin NOT EFFECTIVE**
  + Management is supportive. However, patient **should be placed on broad spectrum Antibiotics until diagnosis well established** (since other bacterial causes are much more likely).
* PREVENTION
  + No vaccine
  + Rodent control and hygiene